

Table 1: Columbus Landfall Theory Scorecard

#	Columbus's Description	Pl	Sa	Co	Wa	Ca	Eg	Gr
1	Saw light 1492/10/11, 10 PM (LAT)	3	1	3	1	3	1	1
2	Island is well watered	3	2	2	3	3	1	3
3	Large laguna in the middle	2	1	3	2	1	3	3
4	Went NNE along I . . .	3	0	3	3	2	3	2
5	. . . to other, E part	3	3	3	2	3	3	1
6	Island is surrounded by a reef	3	3	3	1	3	2	3
7	Large harbor between reef & island	2	2	2	3	3	0	3
8	Fortifiable peninsula	0	1	1	1	3	1	2
9	Saw many islands from I . . .	2	2	2	1	2	3	3
10	. . . and headed for largest	3	3	1	3	0	0	3
11	From I to II is 5-to-7 leagues	2	3	2	3	1	2	3
12	N-S coast of II faces I	3	1	0	1	2	1	3
13	N-S coast of II is 5 leagues long	3	3	0	0	0	1	3
14	E-W coast of II is 10+ leagues long	2	2	0	0	2	2	2
15	Can see III from II	1	1	3	3	0	3	0
16	From II to III is 8 or 9 leagues . . .	3	3	1	1	1	3	0
17	. . . almost E-W	3	3	3	3	3	3	1
18	Coast of III runs NNW-SSE	3	3	3	3	2	3	0
19	Harbor 2 leagues from end of III . . .	3	3	0	0	3	3	3
20	. . . with two mouths	1	1	3	3	1	1	1
21	NW of harbor, part of III runs E-W	3	3	0	0	1	3	1
22	Coast of III is 20+ leagues	3	3	3	3	2	3	0
23	Six hours sailing from III to IV	3	3	3	3	0	0	0
24	N end of IV lies E of III	2	2	3	3	1	0	1
25	Coast of IV runs W . . .	0	0	0	0	2	2	1
26	. . . 12 leagues to C.Hermoso	0	0	2	2	3	3	3
27	N end of IV has many pools	2	2	2	2	1	1	1
28	WSW, C.Isle to C.Verde fix	2	2	2	2	0	0	0
29	C.Verde fix to Ragged is 23 leagues	3	3	3	3	0	0	0
30	W by S, C.Verde fix to Ragged	3	3	3	3	1	0	0
31	From IV to I is 8 leagues	1	1	0	0	3	0	0
Total Score:		70	63	59	58	52	51	47
Average Score:		2.3	2.0	1.9	1.9	1.7	1.6	1.5

In this Scorecard, abbreviations are adopted for obvious space reasons. The scoring system (from 0 to 3): 0 = does not fit the log (Columbus's *Diario*), requires assumption of transcription error; 1 = poor fit to the log, requires unusual interpretation; 2 = reasonable fit with the log; 3 = perfect fit with the log. (Further details below at §D2.) Islands (in order of discovery): I = San Salvador, II = Santa Maria, III = Fernandina, IV = Isabela. (This paper's ultimate identifications: Plana = I = San Salvador, Acklins-Crooked = II = Santa Maria, Long = III = Fernandina, Fortune = IV = Isabela.) The seven vying theories (regarding the identity of I = San Salvador), which are being scored in the above Table 1, are: Pl = Plana, Sa = Samana, Co = Conception, Wa = Watlings, Ca = Caicos, Eg = Egg, Gr = Grand Turk.

Note: Figures 1-8, referred to throughout the text, will be found below at pp.25-28. These eight illustrations are based upon modern maps and-or *Diario* descriptions of the areas in question.

‡2 Columbus's Plana Landfall

Evidence for the Plana Cays as Columbus's San Salvador

by Keith A. Pickering¹

A Introduction

A1 In recent years, the majority of those scholars active in the robust Columbus-landfall controversy have enthusiastically pointed out how their respective theories are a better match with the *Diario* (the log of Columbus's first voyage to the New World) than the Watlings Island theory supported by many historians, most notably Samuel Eliot Morison.² Among the theorists are Arne Molander³ with Egg Island, Joseph Judge⁴ with Samana Cay, Pieter Verhoog with Caicos, Dr. Stephen Mitchell with Conception, Robert H. Power with Grand Turk, and Ramon Didiez Burgos with the Plana Cays. All these theories have, as their purpose, the determination of the location of San Salvador [Columbus's 1st "landfall" — i.e., sighting of land]; and, as their method, the tracing of Columbus's track to and-or among San Salvador & its neighboring islands. All tracks proposed to date have inconsistencies (often serious ones) with the distances, directions, and descriptions provided in the *Diario*. The *Diario* itself is an abstract of Columbus's centuries-lost original log, prepared by (Fray) Bartolomé de Las Casas in the early 16th century; this situation has given rise to a hive of speculations on possible transcription errors, often conveniently located just where they will do a particular theory the most good.

A2 In this paper, I will propose a new track which has fewer inconsistencies and greater fidelity than any proposed thus far; and I will — in an equitable⁵ Columbus Landfall Theory Scorecard (Table 1, p.14) — compare this track to other currently popular tracks, with an eye toward rating the various tracks vs. the descriptions in the *Diario*; and I will show how the *Diario* is far more internally consistent and error-free than many now suppose.

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² Samuel Eliot Morison, *Admiral of the Ocean Sea*, 1942; Little, Brown, & Co., Boston.

³ My knowledgeable friend Arne Molander (whose criticisms have contributed materially to the improvement of this paper) disagrees strongly with many of the views expressed here. Those who wish to hear his side of the ongoing landfall debate may contact him at 19131 Roman Way, Gaithersburg, MD 20879 (telephone 301-948-7341), whence Arne frequently circulates a useful *Columbus Landfall Round Robin*, featuring a spectrum of viewpoints. The *Round Robin*'s printed list of Contributors includes Joe Judge (Senior Editor emeritus, National Geographic), Jim Kelley, & the present writer. The list of Observers includes Charles Burroughs (Washington Area Explorers Club), Dennis Rawlins (*DIO*), Bradley Schaefer (Yale University, Physics Department), & John Russell-Wood (Johns Hopkins University, History Department). Microfilm copies of much of the *Round Robin* correspondence are available from David Henige, Memorial Library, 728 State Str., Madison, WI 53706 (phone 608-262-6397; fax 608-265-2754). [Note by DR: Correspondence-fallout from the present paper is at least as likely to appear in the *Round Robin* as in *DIO*. In fact, some has already appeared in the *Round Robin* — because a version of this paper (subsequently revised) has been circulating privately since 1992.]

⁴ [Note by DR: much of the computer work for Judge's important *National Geographic* studies, on the Columbus landfall question, was supervised by my late friend, the Minnesota scientist-explorer Robert Lillestrand, of Control Data Corp. (Lillestrand was also the scientist primarily responsible for the 1968-1969 precise determination of the northernmost point of land in the world, Kaffeklubben Island, which had been first reached by the premier US arctic explorer, Robert Peary, in 1900 May.)]

⁵ See §D2.

B The Transatlantic Track

B1 There are two ways to trace the track to San Salvador: forward from the Canaries, across the Atlantic; and backward from Cuba. The transatlantic track has been traced at least four times in the 20th century: first by John W. McElroy,⁶ in support of Morison's work; then in 1986 by Luis Marden,⁷ in support of Judge's work. Marden accounted for leeway and drift, which McElroy had not, moving the end-of-track south to the vicinity of Samana Cay; but a year later, Richardson and Goldsmith,⁸ using a more precise accounting for leeway and drift, moved the end of track north again to the vicinity of Watlings. All of these analyses were based on an isogonic chart for epoch 1500 which was drawn by Willem Van Bemmelen in 1899.⁹ Van Bemmelen's study was based on extremely sparse data, however, and its validity is highly dubious (as Van Bemmelen himself was careful to point out). We know for example that archeomagnetic studies are not precise enough to support this kind of application; the most recent work available¹⁰ indicates that the position of the north geomagnetic pole (NGP) for epoch 1500 can be placed only within a radius of some 400 nautical miles (nmi) at the 95% confidence level. This means that the standard deviation of direction for a magnetic vector at a mean point on the Earth's surface is about 8 degrees; which in turn implies that a single standard deviation for the transatlantic track is about 6 latitude degrees, north or south of the mean end-of-track.¹¹ In 1991, Goldsmith and Richardson tried again, creating their own isogons (based on the known landfall of Columbus's second voyage in 1493) and using a shorter length league; this placed the end-of-track in the vicinity of Grand Turk Island.¹²

B2 It is clear from this evidence that regardless of what mean end-of-track one chooses, the uncertainties are at present so large that there is no island in the Bahamas which can be eliminated from consideration on the basis of the transatlantic track.

C The Backward Track

C1 The transatlantic track being unhelpful (without, e.g., more accurate isogons), we are left with the backward track from Cuba. Columbus spent time at four islands in the Bahamas, which he called San Salvador, Santa Maria de la Concepción, Fernandina, and Isabela; the native names are recorded only for the first and fourth, Guanahani and Saometo, respectively. (It is common for Columbus scholars to refer to these four islands, respectively, by Roman numerals I through IV. See abbreviation-key attached to Table 1.) After leaving island IV, Columbus stopped at what he called the *Islas Arenas*, which are today known as the Ragged Islands.

C2 The Ragged Islands constitute the first step in the backward track from Cuba; Ragged is the only Bahama landfall accepted by all (or nearly all) Columbus scholars, and included

⁶ John W. McElroy, "The Ocean Navigation of Columbus on His First Voyage", *The American Neptune*, 1 (1941), pp.209-240.

⁷ Luis Marden, "The First Landfall of Columbus", *National Geographic*, November 1986, pp.572-577.

⁸ Philip L. Richardson and Roger A. Goldsmith, "The Columbus Landfall: Voyage Track Corrected for Winds and Currents", *Oceanus*, 30 (1987), pp.3-10.

⁹ W. Van Bemmelen, "Isogonen-karten für die Epochen 1500, etc.", Appendix to "Die Abweichung der Magnetnadel", a supplement to *Observations of the Royal Magnetical and Meteorological Observatory at Batavia, XXI* (1899) Batavia. Marden did not quote the reference directly. He apparently used the isogonic lines as reproduced in McElroy's 1941 article, as Van Bemmelen did not continue his isogons past 60° W and McElroy extrapolated them.

¹⁰ Ronald T. Merrill and Michael W. McElhinney, *The Earth's Magnetic Field*, 1983; Academic Press, London and New York, pp.84-86 & 99-101.

¹¹ Merrill & McElhinney 1983. This study (among others) also suggests that the 15th century was a period of rapid movement of the NGP; thus, even if we had a better understanding of the position of the NGP at epoch 1500, its position merely a decade earlier might have been nontrivially different. (Curiously, our knowledge is so fuzzy in this connection, that Columbus's reports may contribute as much to it, as it can tell us about Columbus's reports.)

¹² Roger A. Goldsmith and Philip L. Richardson, "Numerical Simulations of Columbus' Atlantic Crossings", *WHOI-92-14*, February 1992.

on the track of nearly every theory. The reason for this wide acceptance is easy to see: the Ragged Islands are in the right direction from Cuba; they are at the right distance from Cuba; and they match Columbus's description of the *Islas Arenas* perfectly — seven or eight islands in north-south¹³ line. The Ragged Islands pass what I call the "3-D test": right distance, right direction, right description. Any island along the track that passes this test can be considered as close to being proven as it is possible to get.

C3 The next step back from the Ragged Islands is to Columbus's Isabela, island IV. But here we seem to be stymied almost before we get started: Columbus tells us the direction he sails (west-southwest) when leaving island IV, but he omits the distance he makes during the day of October 24. However, at dusk Columbus reports that he is 7 leagues southwest of "Cape Verde" (which is "in the western part of the southern part"¹⁴ of island III). This establishes the so-called Cape Verde fix, and allows us to plot his movements from island III instead of island IV. During that night, he makes only two leagues because of bad weather, then makes 5 more leagues the following morning, continuing WSW. At 9 a.m., he turns straight west and makes 11 leagues, at which time he sees the Ragged Islands lying 5 leagues ahead of him.

C4 We now have enough information to compute the distance & direction (backward) from Columbus's Ragged Islands landfall to Cape Verde on island III, using a simple summation of vectors: from island III, we go seven leagues southeast to the Cape Verde fix, then follow the fleet seven leagues WSW, and another 16 leagues west. The summed vector is 19.1 leagues long at a direction 23.5 degrees north of east, which is quite close to east-northeast. We can now plot this on a map, if we know how long a league is. The shortest league mentioned by modern scholars is the 16,240 foot Geometric League (GL) advanced by James E. Kelley,¹⁵ while the longest commonly used is the 19,400 foot Portuguese Maritime League (PML) used by Morison and others. We will use these figures as outside limits in our plot. In Figure 1, I have plotted a box which includes all points lying 23.5 degrees N of E from (i.e., nearly ENE of) the Ragged Islands, at any distance which is between 19.1 GL and 19.1 PML. If we believe Columbus, Cape Verde on island III must lie inside this box.

C5 Only Long Island lies inside the box. Columbus tells us that Cape Verde is in the southern part of island III, and only the southern part of Long Island lies inside the box, which is good confirmation. But, just to be absolutely sure, there is one more test to apply: does Long Island match the description Columbus gives of island III? Does Long Island have a coast at least 20 leagues long? Does Long Island have a coast that runs NNW? Does part of the coast run east-west? The answer is Yes to all these questions. Long Island matches the description in the *Diario*, it is in the right direction from the previous landfall, and it is at the right distance from the previous landfall; Long Island passes the 3-D test. This runs the Egg Island theory aground, which has Andros as island III (Andros matches the description, but is in the wrong direction and is hopelessly too far away). Both the Caicos and Grand Turk theories have Acklins as Island III, but Acklins has the wrong distance, wrong direction, **and** wrong description, as it has no NNW coast.

C6 Having determined the identity of island III, we now work back to island II, using the same technique and applying the same criteria. The distance from Long Island to the western cape of island II is 8 or 9 leagues, and the direction is east — or "almost east-west". In Figure 2, I have plotted 8 GL and 9 PML as the limits of the search box, and have run the box eastward along the coast of Long Island. The box includes part of Rum Cay, but not

¹³ Throughout this paper's tracings of Columbus's inter-island route, we will implicitly identify his compass headings with true ones — i.e., we are presuming effectively zero compass variation in this region in 1492. For transatlantic tracking, the zero-variation assumption would be disastrous; but the errors it introduces over short Bahamian distances are trifling.

¹⁴ Oliver Dunn and James E. Kelley, Jr. *The Diario of Christopher Columbus's First Voyage to America, 1492-1493*, 1989; University of Oklahoma Press, Norman (OK) and London, p.113.

¹⁵ James E. Kelley, Jr. "In the Wake of Columbus on a Portolan Chart", *Terrae Incognitae*, 15 (1983), pp.102-107.

the western cape. Since there may be uncertainties in Columbus's distance estimates,¹⁶ we cannot positively eliminate Rum Cay with this evidence; but the western cape of Crooked Island is within the box, which should lead us to prefer Crooked. Just to make sure, we will apply our final test. Columbus describes island II as having a north-south coast five leagues long and an east-west coast of ten leagues or more. In Figure 3, I have superimposed an F-shaped device over a map of Rum Cay, and over the Acklins-Crooked Island group at the same scale; the F shows a 10-by-5-league coastline in both GL and PML. Rum Cay is only a third (or less) the size of island II; while it is clear that if the north coasts of Crooked and Acklins are considered a continuous coastline, we have a nearly perfect fit. As Gustavus V. Fox has pointed out,¹⁷ the Acklins-Crooked group is the only coast in the central Bahamas that matches this description so perfectly. Acklins-Crooked therefore passes the 3-D test: right distance, right direction, right description.

C7 Rum Cay is in the right direction, but is at somewhat the wrong distance and does not even remotely match the size described in the *Diario*. Mitchell argues¹⁸ that the *Diario* distances are transcription errors of leagues for miles: that Columbus wrote the length of these coastlines as five miles and ten miles, the "miles" being mistranslated into "leagues" by Las Casas. However, we have two witnesses who both saw the Admiral's own copy of the log and reported on its contents: Las Casas, who transcribed the *Diario*, and the Admiral's son Fernando Colon, who wrote a biography of his famous father. Fernando's biography records many details of the first voyage lacking in the *Diario*, showing that Fernando was relying on the original log (not Las Casas's rendition); and Fernando's biography also records the length of these coastlines as five leagues and ten leagues. Thus the suggestion of transcription error by Las Casas is untenable in this instance.

C8 The final step in the backward track is from Acklins to island I, Columbus's San Salvador. There are two estimates given in the *Diario* for the distance from San Salvador to island II: when setting sail on the 14th, Columbus estimates five leagues, but when arriving the next day, he revises this to seven. And the direction is clear: there is only one place in the *Diario* in which Columbus mentions the direction to San Salvador from any other point. The fleet was detained by tides on the morning of the 15th, and arrives at island II around noon. Columbus describes this island as having a coast running north and south for five leagues, and a coast running east and west for more than ten leagues. But here we arrive at a vital passage that is unaccountably missing from nearly every article and book written about the 1st landfall: for Columbus also says, in that very same sentence, that the coast which runs north-south **faces San Salvador**. For anyone searching for the location of San Salvador, this is arguably the single most important description in the *Diario*, because this is the only place in the *Diario* that records the direction to San Salvador from any other point: due east of that five-league-long north-south coast.

C9 Returning to our backward track, we plot 5 GL and 7 PML, working east from the east coast of Acklins. As seen in Figure 4, only the Plana Cays lie within the plot box. Only Plana is at the right distance and in the right direction to be San Salvador. The western end

¹⁶ Kelley 1983 pp.94-97. Kelley's paper brilliantly demonstrates that Columbus's distance-estimates along the north coast of Cuba were inflated because of the half-knot current he was working against. It was these same inflated estimates which earlier led Morison to postulate that Columbus used an ultra-short "land league" when measuring coastlines.

¹⁷ Gustavus V. Fox, "An Attempt to Solve the Problem of the First Landing Place of Columbus in the New World", *Report of the Superintendent of the U. S. Coast and Geodetic Survey* (Appendix No. 18, June 1880). Washington: Government Printing Office, 1882, p.47.

¹⁸ Steven W. Mitchell, "Columbus's Track from San Salvador to Cuba: a New Conception", unpublished lecture notes from U. S. Naval Institute seminar of 24 April 1992, Annapolis. It is true that, at several points in Las Casas's transcription, he originally wrote "leagues" and then crossed this out, substituting "miles". (Columbus's "mile" was considerably smaller than our modern 1852 meter nautical mile.) It seems to me that these false starts simply reinforce the idea that all measurements in the original log were in leagues, and Las Casas was converting to miles as he went along. Since the possibility of transcription error is enhanced when the copyist must pause for such a calculation, the fact that all such instances occur during the recording of miles suggests that miles (not leagues) were the result of these calculations.

of the box bisects West Plana, but given the accuracy of his estimates, this is unimportant. The actual distance from his anchorage off the western point of Plana to Northeast Point on Acklins is 4.6 to 5.6 leagues, depending on the league one chooses. As a final test, we check the description. Does Plana have a coast that runs north-northeast? Does Plana have a laguna, reef, and harbor? Yes to all questions; Plana passes the 3-D test. Samana Cay is at the right distance from Acklins, but it is in the wrong direction and does not match the description, since it has no north-northeast coastline. Only Plana is in the right direction, at the right distance, and matches the description. Only Plana can be San Salvador.

C10 Since Columbus had previously stated his intention to sail southwest when leaving San Salvador, this implies that Columbus changed his mind. As we shall see, Columbus was unsure of his destination on the following day, so this makes perfect sense. When we have such a case as this — when Columbus's before-the-fact intention disagrees with his after-the-fact description — the preferred interpretation should **always** by the after-the-fact description. This is especially true when, as in the present instance, Columbus shows doubt in the interim.

C11 Also note that the *Diario* does not say that the entire east coast of island II is five leagues long. The *Diario* addresses only the length of the coast that faces San Salvador. South of Creek Point, the coast of Acklins turns southwest and no longer faces Plana. According to the *Diario*, the coast of island II facing San Salvador must have two independent qualities: [a] it must run north-south; and [b] it must be five leagues long. Of those islands that are possible first-landfall sites, only Plana and Grand Turk pass both of these tests. Samana passes neither test; ditto Watlings; ditto Conception; ditto Egg. It is astonishing to find that this critical clue has been ignored by almost every landfall theorist of the 20th century, including (but not limited to) Morison, Judge, Molander, and Mitchell; it is distressing to find that most theorists not only do not attempt to solve the problem, in most cases they fail even to inform their readers that the discrepancy exists.

C12 Fox was one of the few landfall theorists to deal with this problem; in his original paper advocating the Samana landfall, he attempted to dispose of this inconsistency.¹⁹ Fox relied on R. H. Major's suggestion that what Columbus really meant was that the north-south coast faces in the direction that Columbus arrived at Acklins while sailing from San Salvador. This is one of the few times that the Samana theory dips into what David Henige²⁰ derisively calls Presumably-Columbus-Meant-To-Say thinking — an infinitely flexible form of logic capable of explaining any discrepancy. Fox further assumed that Columbus was so poor a sailor that he could not compensate for tidal currents, another highly debatable point.

D Keeping Score

D1 Many of the descriptions of San Salvador in the *Diario* are too vague to be of much use in comparing the various theories against each other. For example, Columbus describes San Salvador as "green" and "flat", but compared to his previous landfall in the Canaries, any island in the Bahamas could be considered green and flat.

D2 Question: can the strengths and weaknesses of the many landfall theories be objectively evaluated? The prospects for such a delicate enterprise will be enhanced if we write down each important description in the *Diario* and then compare the several competing theories with each description, assigning a score or ranking to each. I have done this in Table 1, printed at the start of this article (p.14): the Columbus Landfall Theory Scorecard. In 1986, Arne Molander²¹ performed a similar numerical evaluation, when comparing the

¹⁹ Fox 1880, pp.47-48.

²⁰ David P. Henige, "Samuel Eliot Morison as Translator and Interpreter of Columbus's *diario de a bordo*", *Terrae Incognitae*, 20 (1988), p.85.

²¹ Arne Molander, "Egg Island is the Landfall of Columbus", *San Salvador Conference* (1st: 1986; College of the Finger Lakes, Bahamian Field Station), pp.161-169.

Watlings and Egg Island theories. The current evaluation is different in that: [a] it includes seven theories, and [b] the clues are not ranked as to weight. Also, there are quite a number of differences in which clues are included and which are excluded. I have concentrated on quantitative descriptions in the *Diario*: distances, directions, and existence of fixed features; and generally excluded those clues for which only circumstantial evidence is available for evaluation. For example, Molander gives Watlings the edge on cultivation of cotton; I have excluded this clue, on the grounds that the best current evidence is very spotty, regarding the distribution of native cotton in the pre-Columbian era.²² Also, I have assigned a score to each clue for each theory, not just to that theory which is superior. These scores are necessarily subjective, and therefore open to debate. I can only state that I have made every effort to be as objective and fair as possible, and have tended to give theories the benefit of the doubt whenever possible.

D3 To win the debate, a theory must show its clear superiority over every other competing theory, and through the entire track from San Salvador to the commonly accepted later Ragged Islands landfall. As the Scorecard shows, the only theory that can do this is Plana. In order to find out why, let us again trace Columbus's track, this time going forward from San Salvador, evaluating the various theories with respect to the *Diario*.

E San Salvador as Columbus Saw It

E1 One of the most famous parts of Columbus's account is his sighting of land on the night of October 11 in the form of a dim light in the west. This sighting has generated controversy among Columbus scholars, primarily because the sighting took place at 10 p.m., four hours before land was actually sighted — at 2 a.m. on the 12th (by Rodrigo de Triana of the *Pinta*, which announced the historic moment via pre-arranged signal). At the speed the fleet was travelling that night, Columbus must have been about 35 or 40 nautical miles from San Salvador: an impossible distance to see such a light, in spite of attempts to prove otherwise. Some islands have an advantage in this regard, however, since it is possible that the fleet passed close by another island earlier in the night, from which the light was seen. Proposed landfalls which have such an island to the east rate a 3 on the Scorecard; those which do not are forced to rely on Morison's explanation that Columbus's eyes were playing tricks on him. Morison's explanation seems unlikely, however, since at least two other persons saw the light at the same time; but in the interests of mercy, we will evaluate these landfall-theories with a 1, instead of a 0. [After spotting land at 2 AM of Oct.12, Columbus held position, a few miles to the east of San Salvador, until dawn. It is a historian's privilege to empathize with the discoverer's ecstatic frame of mind in these first post-uncertainty hours, during which he could at last savor the realization that the visionary success he so deserved had actually come true. One doubts he spent any of these hours in sleep: indeed, his diary entries for Oct.11&12 run together. Finally, as the grand morn of Oct.12 broke, his party — spying a flock of curious natives on the beach — went ashore.]

E2 The important question of San Salvador's size poses a knotty problem, since the *Diario* does not give the size as a quantified measurement; and because two other sources (Las Casas's *Historia de las Indias* and Ferdinand Columbus's biography of his father) each describe the size of the island as 15 leagues. Morison has speculated that the 15 leagues actually refers to the size of island II, and somehow was attached to San Salvador by mistake. [A mistake which might be related to Columbus's or a follower's desire to magnify his find.] I nonetheless prefer a quite distinct speculation: that the 15 league value refers to the size of Cat Island, which is about that size, and which is identified as "Guanahani" or "San Salvador" on many 16th and 17th century maps. Under this assumption, the name Guanahani (or a similar name: native names are notorious for near-homonyms) applies to

²² Richard Rose, "Lucayan Lifeways at the Time of Columbus", *San Salvador Conference* (1st: 1986; College of the Finger Lakes, Bahamian Field Station), pp.328-329.

more than one Bahamian island. Cat Island itself has not been seriously advocated as the site of the first landfall since the *Diario* became widely known in the 19th century, because of its serious inconsistencies with the inter-island track. The *Diario* itself is of no particular help, with Las Casas describing San Salvador three times as an "*isleta*" ["small island"], and later quoting Columbus calling it an "*isla*", and a "*bien grande*"²³ one at that. Yet it was apparently small enough for Columbus to have explored substantially all of it by a small boat in a few hours. What we are left with, then, is little if any solid contemporaneous evidence on the size of San Salvador. For this reason, I have excluded the question of size from the Scorecard.

E3 Plana, Egg, and Caicos are multiple islands; the other contenders are single islands. It is true that Columbus nowhere says that there is more than one island at San Salvador. Is it equally true that Columbus nowhere says that there is only one island at San Salvador. Columbus gives San Salvador only one name, yet it is common practice among navigators and cartographers to give one name to more than one island: Midway is an example, Andros (in the Bahamas) is an example. And Plana itself is an example: five hundred years later, still only one official name for these two closely spaced islands. Columbus's use of "*la isla*" is no help, since if San Salvador is multiple, the singular could simply denote that particular island to which Columbus is referring at the time. We are therefore left with Columbus's sole description of the San Salvador coastline, in a single sentence: "I . . . went north-northeast along the island in order to see what there was in the other part, which was eastern part, which it has."²⁴ The final codicil *que habia*, as Molander has pointed out, is almost universally omitted from translation; yet it is important because every island has an east coast, but San Salvador has another part, which is the eastern part. And in order to reach this eastern part, it is necessary to go north-northeast along the island. Plana fulfills these requirements of the *Diario* perfectly well.

E4 Columbus explored San Salvador on the 14th, using both the boat from the ship, and the launches from the caravels. Much has been made of this exploration by some small island advocates, principally Judge,²⁵ who noted that at Watlings the trip to Graham's harbor, proposed by Morison, is too long to row. However, we know from the *Diario* entry of October 24 that the ship's boat carried a sail; and we have good reason to suspect that the caravels' launches did, too. On January 1, the launch made a round trip of 28 nmi (Navidad-Amiga-Navidad) between midnight and vespers, to collect rhubarb. Sunset (hence compline) occurred at about 5:30 on January 1, so vespers was at about 4:30. Allowing an hour ashore (for the rhubarb) leaves 15.5 hours of travel time from a midnight departure, at an average speed of about 2 knots. This implies that the launch was being sailed, not rowed. But regardless of whether one assumes rowing or sailing, the January 1 trip makes it quite clear that the boat trip of October 14, for both Watlings and Plana, is within the capabilities of the launch, in terms of both speed and endurance. I am assuming about 9 hours of boat travel on the 14th, which seems reasonable considering the niggling distance made by the ships before nightfall. Since all proposed boat trips fall within the parameters of possibility, I have evaluated all theories equally by excluding this clue from the Scorecard.

E5 Columbus's description of going NNE along San Salvador gives a huge headache to Samana Cay supporters, since there is no comfortable way to make this description match Samana. The entire island of Samana lies east and west; and since the ends are sharp points, there is no north-northeast coast at all. Judge supposes that Columbus may have spent a few minutes on a north-northeast course during five or six hours of rowing east and west along the south coast of Samana. And when he got back to his ship, he then wrote in his log that his most notable direction of travel was north-northwest, and conveniently ignores

²³ The correct English translation of *bien grande* is much in dispute. For what it's worth, I prefer "good sized" — which nicely reflects the ambiguity of the Spanish.

²⁴ Following Dunn & Kelley 1989, p.73; with the final three words added by this author.

²⁵ Joseph Judge, "Columbus's First Landfall in the New World", *National Geographic*, 170 (November 1986), pp.589-590.

the remaining six hours. Frankly, this scenario is completely unconvincing. I gave Samana a 0 on this point in the Scorecard.

E6 Grand Turk has the opposite problem: the entire island lies north-south, so while there is a little bit of NNE coast, the island has no appreciable “eastern part”, it has only northern and southern parts. I gave Grand Turk a 1 on this point.

E7 At Watlings Island it is possible to go north-northeast along the coast, which rates a 3 on that point. However, if you go north-northeast along Watlings, you do not get to the eastern part of the island; you get to the northern part of the island. Watlings is somewhat wider than Grand Turk, though, so I gave it a 2 on the “eastern part”.

E8 Look at a map of Plana, however, and Columbus's words require no explanation because the meaning is so self-evident. Columbus was anchored off the southwest point of West Plana (the logical anchorage in the prevailing NE trades). He wanted to go to “the other part, which was the eastern part”; and, to get there, he was required to go north-northeast along the island. Egg Island, and Conception to a somewhat lesser extent, also follow this coastline pattern. I gave 3's to each.

E9 By the way, this sentence is the first of two instances where Columbus refers to the duality of San Salvador. Columbus uses the word “part” often in the *Diario* to describe islands having eastern parts, northern parts, southern parts, and so on. But this is the only place in the Bahamas where Columbus describes an island as having an “other” part: other, implying separateness. And when Columbus arrives at this “other part”, how does he describe it? He describes it as “that island”. Not “the island”, not “this island”, but “that island”, again implying separateness. Columbus says that he was afraid to go ashore, because “that island” was completely surrounded by a reef; and East Plana is in fact completely surrounded by a reef, just as Columbus describes.

E10 Of course reefs are ubiquitous in the Bahamas, but the reef described by Columbus must entirely surround the island, which is a more difficult requirement. Most of the proposed islands fare pretty well, but the reef at Watlings clearly does not encircle the island. Further, the reef must be offshore, since the large harbor is between the reef and the island; this requirement foils the Egg Island theory, whose “reef” is an onshore coral barrier.

E11 One of the enduring controversies surrounding the identity of San Salvador is the correct translation of the word *laguna*. Columbus says that San Salvador has a very large *laguna* in the middle, which has been variously rendered as “lake” and “lagoon”. The modern *Diccionario* of the Royal Spanish Academy defines *laguna* as “A natural deposit of water, generally fresh and commonly of smaller dimension than a lake.” The Harper-Collins Spanish dictionary agrees, translating the term as “pool”. But these are modern usages; do they conform to 15th century usage? And, specifically, does the word *laguna* imply either fresh or salt water, and does it imply any kind of size?

E12 Other than the case at hand, there are eight times when *laguna* or *lagunas* is used in the *Diario*. In one case, Columbus uses the phrase *laguna de mar* (“pool of the sea”) to describe a saltwater feature, even though it is obvious from the context that the feature is part of the sea. It is therefore reasonable to suppose that if the *laguna* on San Salvador was part of the sea, or an arm of the sea, Columbus would have used the phrase *laguna de mar* to describe it. The other seven usages of *laguna* all take place at the northern end of Isabela, and it is clear that the *lagunas* there are fresh, since Columbus fills his water casks from them. Also, Columbus describes these *lagunas* as being “grande”, yet they are small enough to walk around and shallow enough to wade into. Therefore, Columbus appears to be using *laguna* in the same way as the modern dictionary: to describe a feature which is both fresh (or at least unconnected to the sea) and fairly small. The *laguna* on West Plana, at three-fourths of a mile long, fills both requirements perfectly. But the *Diario* also says that the *laguna* is in the middle of the island. The *laguna* on West Plana is not in the middle when viewed from above, but is in the middle of the coast when viewed from the vantage point of Columbus's anchorage. I have been generous in the scoring of this point to allow room for alternate interpretations.

E13 One of the most vexing clues for any landfall theory is the peninsula that Columbus describes as being a good place for a fort. No candidate island has such a peninsula at the present time. Proponents of Watlings, Samana, Egg, and Conception point to islands separated from their main island by shallows, which are supposed to have been sand-filled in 1492 and since washed away by storms. The Plana theory proposes the reverse process: the far end of the peninsula has become attached to the main island by sand deposition in the intervening centuries, forming an inland lagoon. There are currently two such lagoons at Plana which may have been the site of such deposition, one at the east end of East Plana. Each lagoon has two isthmuses which, if either were eliminated, would make the required peninsula. Core samplings could determine if any of the four isthmuses were a recent feature. Since the Plana theory is open to criticism on this point, I have given it a 0 on the scoresheet, pending definite geological evidence. It is interesting to note in this context that Judge's original peninsula candidate, on the southern shore of Samana, has been proven a recent feature of non-cemented sediments. It therefore seems possible that the feature seen by Columbus could have been entirely sand-based, and could have entirely washed away in the intervening time, without leaving any clue for modern scholars.

F Through the Islands

F1 After exploring San Salvador, Columbus returns to his ship, and there follows one of the most intriguing passages in the *Diario*. “I . . . set sail and saw so many islands that I did not know how to decide which one to go to first Finally, I decided to go to the largest, and so I am doing. It is about five leagues distant from this island of San Salvador, and the others, some more and some less.”²⁶

F2 First, it seems strange that Columbus did not know how to decide which way to go, since the previous day he had stated his intention to sail south or southwest to find the source of the natives' gold. And how far would Columbus have had to sail from San Salvador in order to see another island five leagues away? The answer is, no distance at all. Columbus could have seen this second island, at a distance of five leagues, anytime while at anchor during the previous two days (assuming an average height for a Bahamian island).

F3 These apparent inconsistencies are resolved when we realize that Columbus's ships possibly did not have ratlines. Sending a man into the masthead was therefore a difficult operation; the masthead was not a normal watch-standing position, and no one was sent up the mast without a specific reason such as searching for a landfall. It seems likely to me that there just wasn't anyone in the masthead between landfall on the morning of the 12th and setting sail again on the 14th. Setting sail provides a good opportunity to put a man in the mast, because a lookout can ride up on the yardarm as it is hoisted into place. When Columbus set sail that afternoon, he sent a man up — and while still only a few dozen meters offshore, he had a major shock. He discovered to his surprise that San Salvador was part of a huge and previously unimagined archipelago. Upon questioning his native guides, he found that there were more than a hundred islands in these waters.

F4 That is why Columbus did not know how to decide which direction to take. Eventually, he decided not upon the southernmost nor the southwesternmost island, nor on the island closest to the gold; he decided upon the **largest**. In other words, faced with this discovery, he temporarily put aside the idea of gold, and sailed instead to find new lands for his sovereign.

F5 Columbus's description of his dilemma on the 14th certainly is interesting and useful, but nowhere that day does Columbus tell us the direction in which his destination island lies. This turns out to be a minor point, however, because after arriving the next day, he neatly fills in the gap.

²⁶ Dunn & Kelley 1989, p.77.

F6 After arriving at island II on the 15th, Columbus says, "I found that the face which is in the direction of San Salvador runs north-south and that in it there were five leagues; and the other, which I followed, runs east-west."²⁷ If the north-south coast faces San Salvador, and the east-west coast by implication does not face San Salvador, it is clear that San Salvador can lie in only one direction: due east of that five-league-long north-south coast. Only Plana and Grand Turk receive full marks on this point. Ramon Didiez Burgos, the first to propose Plana as San Salvador, has Columbus's anchorage on the night of the 15th on the north shore of Crooked.²⁸ I prefer Judge's route around Bird Rock to Landrail Point (see Figure 3), in view of the wind shift to the southeast which threatened the anchorage.

F7 Columbus sails from island II, which he names Santa Maria, to an even larger island III that he calls Fernandina. He estimates the distance between the two islands at nine leagues at first, then revises it to eight leagues "almost east-west". He says on the 16th that this coastline "may" be more than 28 leagues, but on the next day, after actually exploring it, he says that he saw only 20 leagues, and "it did not end there". The east coast of Long is 22 leagues, using James E. Kelley's 2.67 nmi league. The Grand Turk theory requires us to believe that Columbus sailed from Mayaguana to Acklins, across some 40 miles of open ocean, and **mistook it for a coastline**.²⁹ This is the kind of explanation that rates a 0 on the Scorecard.

F8 One of the objections to the Plana-Samana route is that Columbus says that island III is visible to him while he is still at island II. This seems to be in contradiction to his later assertions that the distance between the two islands is 8 or 9 leagues. However, this is not necessarily the case. If Columbus anchored along Landrail Point on the night of the 15th, he would have had to sail around the western end of Crooked Island. Since the caravels were faster ships than the Santa Maria, it is possible that one of them went far enough into the Crooked Island Passage to make out the island. Or, Columbus might have learned of the island from the Indians: at one point, he says he has an "indication" (*amuestra*) of the island's presence.

F9 Didiez Burgos shows Columbus circumnavigating Long Island, which seems particularly unconvincing to me; again, Judge's track along the east coast of Long is far superior. Columbus describes a harbor 2 leagues from the end of island III. The harbor has two narrow entrances separated by an *isleo*, or small island: a description that fits Little Harbor (Figure 2) passably well, although Little Harbor has two small islands in the entrance. Fox identified Burrows Harbor, slightly farther south, as this harbor. Fox's harbor has two mouths, but it is only about half the correct distance from the end of the island. In my mind, either of these harbors is a better fit than the Newton Cay harbor at the northern tip of Long, which is the candidate of the Watlings and Conception theories; this harbor is far too close to the northern end of the island. The Egg Island theory has this harbor at Conch Sound on Andros, which has only one wide opening. Caicos-advocates use Lovely Bay on Acklins, which has many wide openings instead of two narrow ones; and the Grand Turk theory uses Abraham's Bay on Mayaguana, which has two openings but no *isleo*. Columbus sails NW from this harbor "as far as the coast that runs E-W", which is another problem for the Watlings-Conception theories, since there is no such E-W coast, nor any coast at all, north of Newton Cay.

²⁷ Dunn & Kelley 1989, p.77.

²⁸ Ramon J. Didiez Burgos, *Guanahani y Mayaguain*, 1974: Editoria Cultural Dominicana, Santo Domingo, p.171.

²⁹ Robert H. Power, "The Discovery of Columbus's Island Passage to Cuba", *Terrae Incognitae*, 15 (1983), pp.165-167.

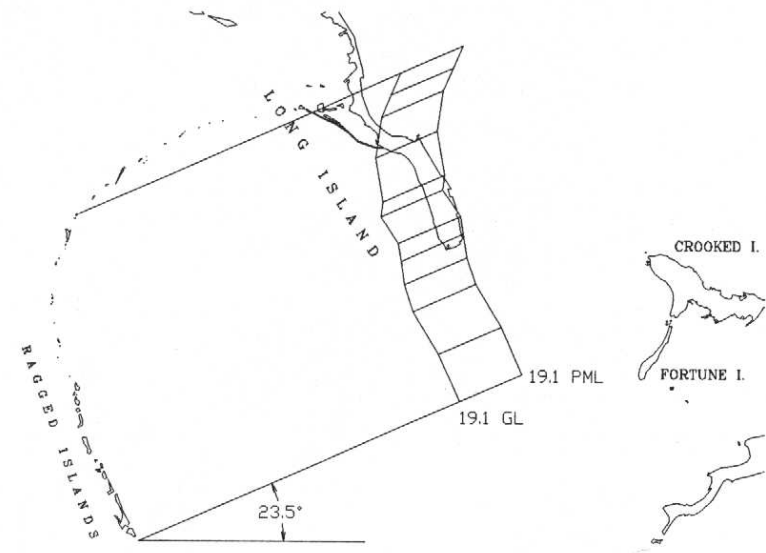


Figure 1. The plot box shows all points which can be considered 19.1 leagues from the Ragged Islands in a direction 23.5° north of east. Part of island III should lie in or near the plot box. See §C4.

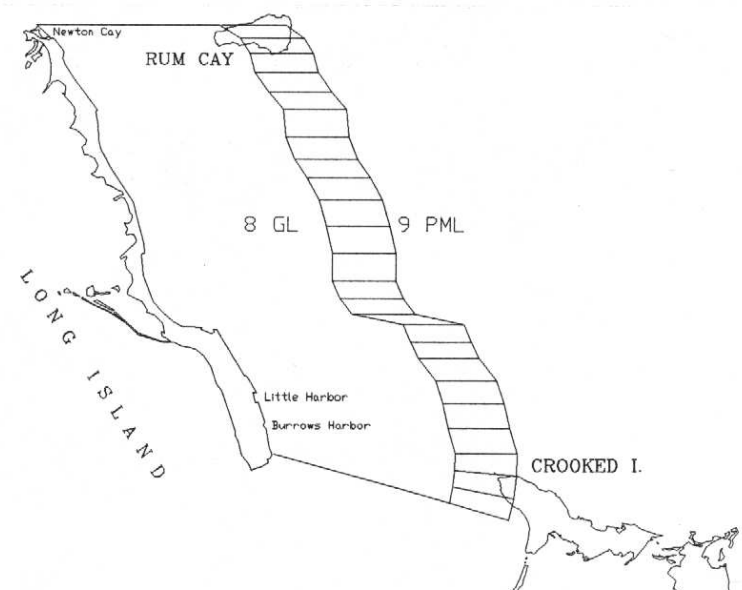


Figure 2. The plot box shows all points between eight and nine leagues east or almost east of Long Island, island III. The closest point of island II should lie in or near the plot box. See §C6.

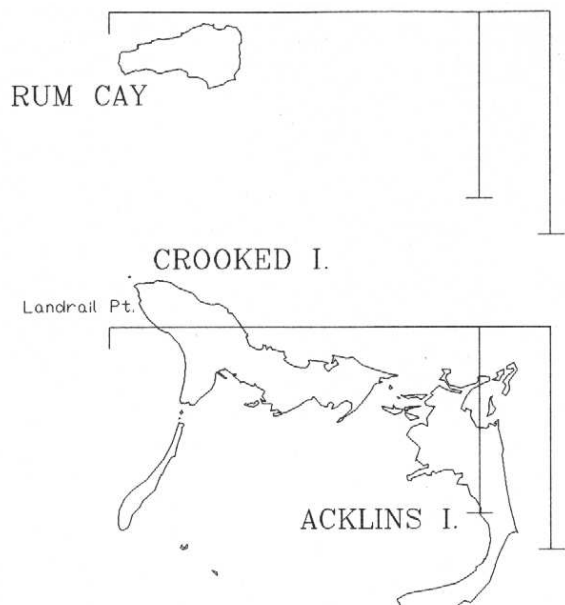


Figure 3. Island II candidates Rum Cay and the Crooked-Acklins group at the same scale. The F-shaped device indicates the size of ten league and five league coasts, using Geometric Leagues and Portuguese Maritime Leagues. See §C6.

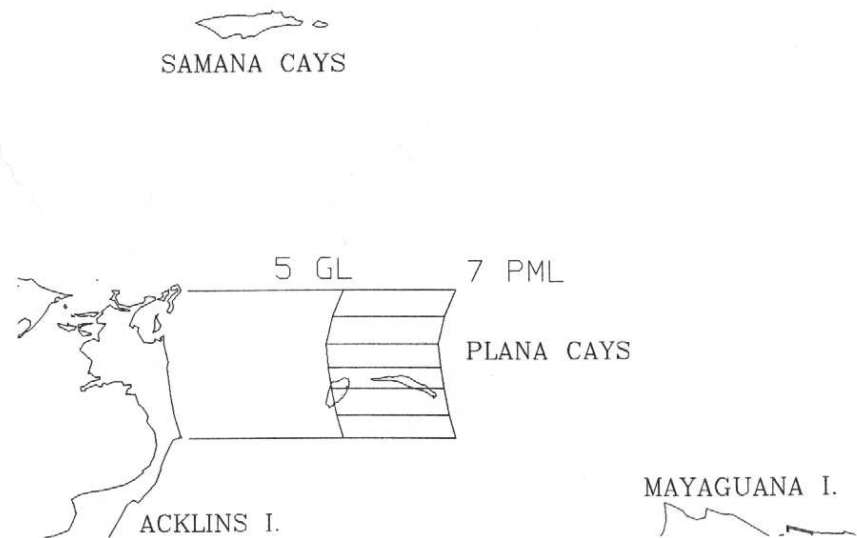


Figure 4. The plot box shows all points between five and seven leagues east of the north-south running coast of Acklins (island II). Island I should lie in or near the plot box. See §C9.

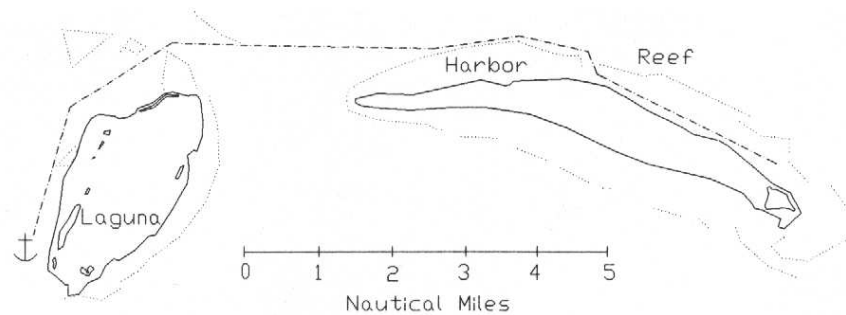


Figure 5. The Plana Cays (island I), showing one possible route for the boat exploration of October 14. See §E4.

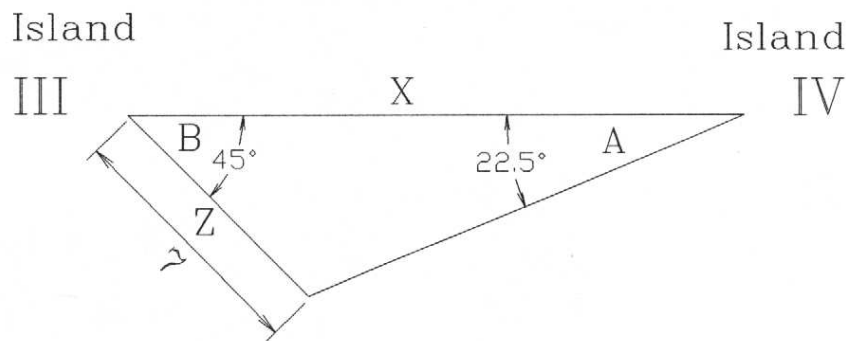


Figure 6. Columbus left island IV on a WSW course, reaching a point seven leagues SE of Cape Verde on island III. If island IV is directly east of Cape Verde, distance X must be 17 leagues. See §F12.

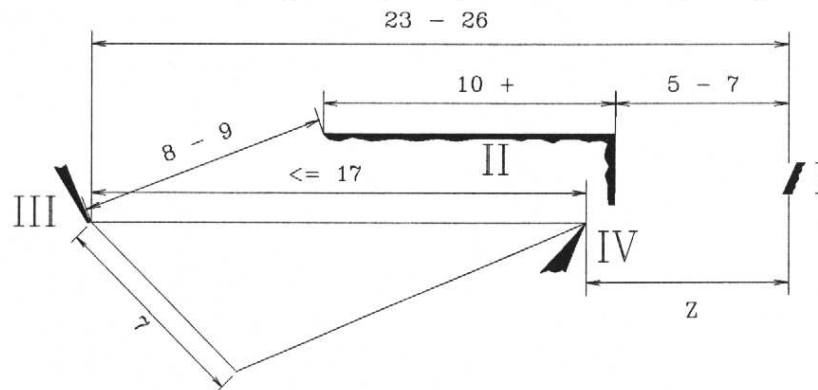


Figure 7. The relative positions of the four islands, based solely on the descriptions in Columbus's log. The distance from island I to island III can be measured both via island II and via island IV. See §H1.

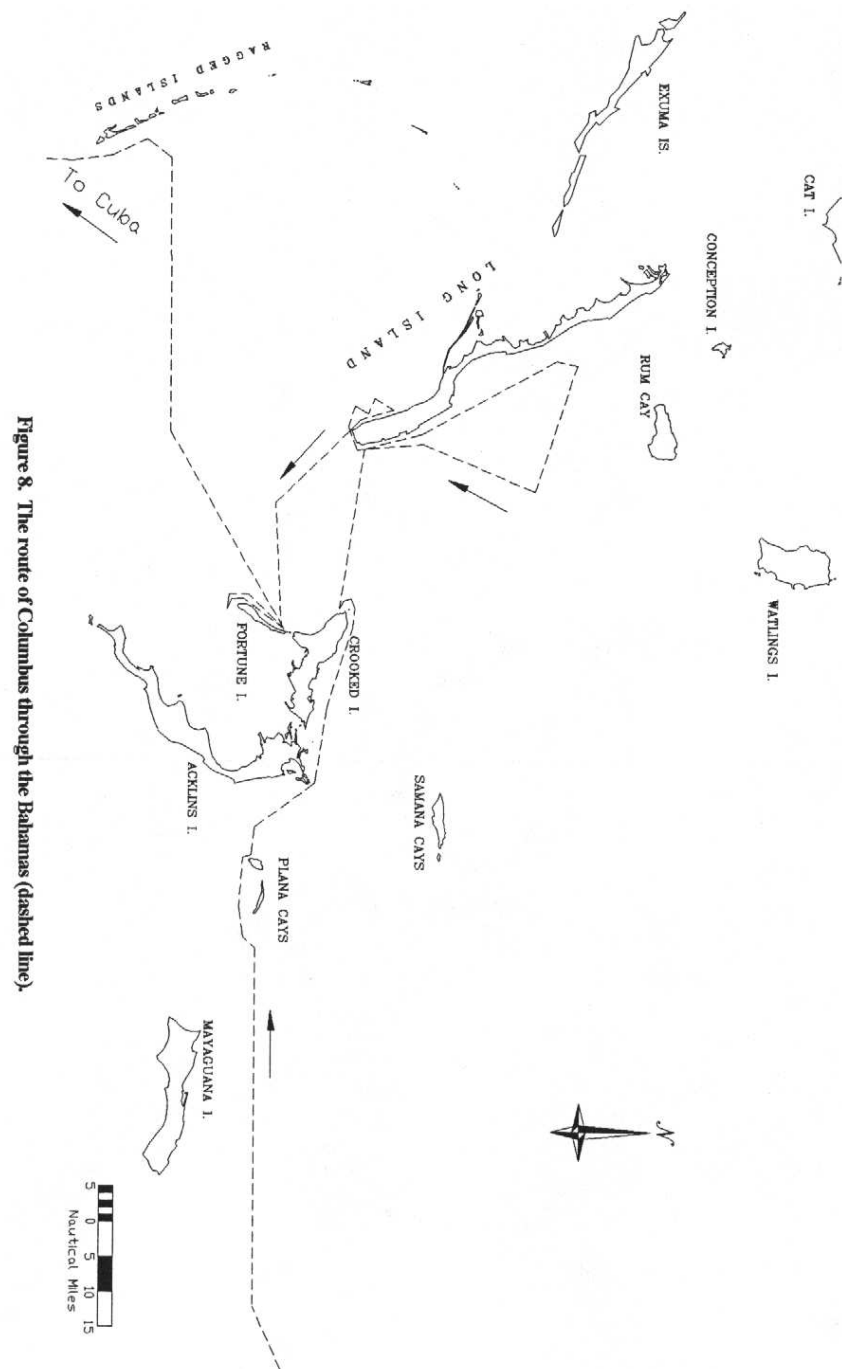


Figure 8. The route of Columbus through the Bahamas (dashed line).

F10 On the evening of the 17th, the Fleet runs into foul weather. Columbus heads for the southern cape of the island to anchor; as the wind was northwest, this cape would have afforded shelter. He spends the 18th continuing around the island when the weather allows; he anchors when it does not, mentioning that “I did not go ashore”. In moderate winds, Columbus would have reached South End on Long Island about midday, and spent the afternoon (or part of it) beating northward a few miles along the west coast of the island. This is slow, wind-in-your-face sailing, and Columbus had only a few daylight hours before he was forced to give up and return to the only available anchorage, near South End. The Egg Island theory requires us to believe that Columbus spent this entire day out of sight of land, sailing at top speed through the treacherous shoals between Andros and Long, anchoring in the Jumentos Cays. In a similar fashion, the Caicos theory also requires Columbus to sail away from Fernandina on the 18th, in direct contradiction of the *Diario*. The reason: there are only 6 hours of sailing from island III, Fernandina, to island IV, Isabela, and these theories require extra time to make the distance. No mere transcription error can save these theories here; one must instead assume that Columbus just did not know what he was talking about when he wrote the entry of the 18th. This is again the kind of discrepancy that rates a 0 on the Scorecard.

F11 Columbus sets sail the next morning, spreading the fleet from ESE to SSE; after three hours, he makes his landfall at Isabela, island IV. Nowhere does Columbus tell us the distance between Isabela (IV) and Fernandina (III). But let us make some reasonable assumptions: the maximum speed in the transatlantic crossing was 3 leagues per hour, thus, Columbus could have been no more than 9 leagues from island III when he made his Isabela (IV) landfall. Next, if we take the shortest reasonable length for the league (2.67 nautical miles) and the highest reasonable height for a Bahamian island (50 meters), then — using 15 m as the height of the ship’s observer — we conclude³⁰ that island IV could have been as much as 8.6 leagues distant at landfall. So the maximum distance from island III to island IV is 17.6 leagues, although it could well be less than this.

F12 Now, Columbus mentions that the northern end of Isabela (island IV) is on an E-W line from Fernandina (island III); there is reason to doubt that this is precisely true, but let us assume for the moment that it is. When Columbus departs Isabela (IV) on the 24th, he sails WSW from its northern point, for an unspecified distance, until he sees Cape Verde, the southern point of Fernandina (III), lying 7 leagues to the NW (see Figure 6). All right now, trigonometry³¹ fans: if the angle *A* in Figure 6 is 22.5 degrees, and angle *B* is 45 degrees, and side *Z* is 7 leagues, what is the length of side *X*? The answer: 16.9 leagues.

F13 Striking. We have now calculated the distance from island III to island IV in two completely different ways (§F11 & §F12), and have arrived at answers that agree within less than a league: 16.9 leagues & 17.6 leagues. I must again (as at §F11) point out that this distance could be less than the mean result, 17 leagues (indeed, by our Plana track, it is c.10 leagues, Long-to-Fortune: §G1 [b] or Figure 8), since Columbus sailed from III towards IV on a SE & then E course, for under 6 hours, and likely he was making less than 3 leagues per hour. But it could not be greater than 17 leagues, since this would require Columbus to have sailed NE from III, in contradiction to the *Diario*, and at speeds greater than 3 leagues per hour, which is most unlikely.

F14 It is this beautiful internal consistency of the *Diario* that does in the Caicos theory, the Grand Turk theory, and the Egg Island theory. Each of these theories requires far more distance from island III to island IV than the *Diario* allows. The Egg Island theory assumes that the 7 leagues to Cape Verde is a transcription error for 70 leagues. And indeed, if one assumes that Columbus was estimating the direction from a 16-point compass instead of a 32-point, a portion of northeastern Andros just does meet this criterion. However, this does not help much, since Columbus also says that Cape Verde is in the western part of

³⁰ Computation: $2.1[50^{1/2} + 15^{1/2}]/2.67 = 23$ nmi, or 8.6 leagues.

³¹ Whether computed by plane or spherical trigonometry, the results (for such a small spherical triangle) naturally agree almost perfectly.

the southern part of island III, and the Egg Island theory must here put Cape Verde in the eastern part of the northern part of island III. In other words, one must assume the existence of three separate transcription errors in the same sentence in order for the theory to fit the *Diario*.

G The Inconsistencies of Isabela

G1 Twice our Plana theory rates a 0 on the Scorecard regarding Columbus's description of island IV, Isabela, called Saometo by the natives. When Columbus arrives at the northern tip of island IV, Cabo del Isleo, he notes that the coast from there runs west [which sounds *prima facie* unlikely if there is a north tip] for 12 leagues, to a cape called Cabo Hermoso. Here it proves impossible to take the *Diario* at face value. Consider the following: [a] The north point of island IV is on a west-to-east course from island III, or maybe (as suggested by the sailing directions from III to IV: §F11) rather south of east; [b] Columbus reached this point in less than 6 hours, sailing approximately east-southeast (*idem*), suggesting that the actual III-to-IV distance is most likely in the range of 10 to 12 leagues (which is indeed about the distance from Long to Fortune: Figure 8); [c] from the north point of Isabela, the coast runs west for 12 leagues. So it seems that the coast that runs west from Isabela must intersect or almost intersect Fernandina, yet it took 3 hours of sailing even to see the island.

G2 Clearly there is an error here, and there have been many attempts to explain it. Oliver Dunn and James E. Kelley have suggested³² that *gueste* (west) is a mistranslation of *sueste* (southeast), which supports the Watlings-Conception identification of Crooked Island as island IV.

G3 There is further reason to believe that the coast cannot actually run west from Cabo del Isleo to Cabo Hermoso. First, if the coast actually runs west, how is it that Columbus, on an easterly course, arrives at island IV at Cabo del Isleo without first coming to Cabo Hermoso? Second, if the coast runs west from Cabo del Isleo, how is it that when Columbus departs from Cabo del Isleo on the 24th, he sails WSW, and yet does not run aground on that coast? Yet Columbus says that Cabo Hermoso is in the western part of the island.

G4 This is one of the few times when the *Diario* shows an internal inconsistency, and the best way to resolve it is to suppose that the coast runs southwest, not west, from Cabo del Isleo to Cabo Hermoso. This solves the problems of the approach and the departure, while allowing Cabo Hermoso to remain in the western part of the island. The idea is reinforced by an interesting observation: on the evening of the 19th Columbus anchors for the night at Cabo Hermoso, yet on the following morning, the 20th, he weighs anchor from another cape, Cabo del Laguna. Dunn and Kelley have pointed out that the best explanation of this is the supposition that Cabo Hermoso and Cabo del Laguna lie very close to each other;³³ and Cabo del Laguna, Columbus tells us, is at the southwestern end of Isabela. We therefore require a transcription error in the *Diario*, not to make the *Diario* match the Plana theory, but instead to make the *Diario* match itself. The coast from Cabo del Isleo runs southwest, not west, to Cabo Hermoso.

G5 Plana also rates a 0 on the Scorecard in the distance from Cabo del Isleo to Cabo Hermoso, given by Columbus as 12 leagues. Here, for the first and only time in this paper, we require a numerical transcription error to make the *Diario* match the theory. Perez³⁴ suggests that *doze* (twelve) is a mistranscription for *dos* (two); this fits if you believe that Isabela is the modern Fortune Island, since the south coast of Crooked extends west from the north point of Fortune for about this distance. In other words, a *single letter* of the original log was miscopied or illegible to a transcriber.

³² Dunn & Kelley 1989, p.99.

³³ Dunn & Kelley 1989, p.103.

³⁴ Alejandro R. Perez, *Columbus's First Landfall in America and the Hidden Clues in his Journal*, 1987: ABBE Publishers, Washington, D.C., p.68.

G6 With these corrections, the log reads that from Cabo del Isleo, the northern point of Isabela, the coast runs southwest two leagues to Cabo Hermoso, and Cabo del Laguna lies nearby at the southwestern end of the island. This description matches Fortune Island, island IV of the Plana-Samana track.

H The Cycle of Distances

H1 One of the arguments against the Plana-Samana track is that Columbus would have had to return to a place which he had visited before (since Crooked lies quite close to Fortune); and since there is no explicit mention of Isabela (island IV) being close to Santa Maria (island II), the implication is that the two islands are far apart. This idea is countered by another beautiful internal consistency in the *Diario*, as shown in Figure 7. Since the distance from III to II is 8 or 9 leagues "almost east-west" (§C6), and the distance east along II is "ten or more" leagues, and the east-to-west distance from island II (Santa Maria) to island I (San Salvador) is 5 to 7 leagues, this means that the total E-W distance from I to III is 23+ to 26+ leagues. Since we previously determined from internal descriptions that the distance from III to IV is 17 leagues or less, we now have an important result:

Distance *z*, from Isabela (IV) to San Salvador (I), is 6+ to 9+ leagues E-W, or more.

H2 This result is critical because on November 20, while sailing north of Cuba, Columbus tells us the distance from Isabela (IV) to San Salvador (I): 8 leagues.

H3 Bingo again! We now have a beautiful and internally consistent cycle of distances among these four islands. To restate the case, the *Diario* gives us two different ways of figuring the total east-west distance from island I (San Salvador) to island III (Fernandina): one way via island II and another way via island IV. Both of these measurements are substantially consistent with each other. But this internal consistency of the *Diario* breaks down if we assume that any one of these distances is in miles instead of leagues; so the Conception theory, which measures coastlines in miles, founders. And this internal consistency of the *Diario* also breaks down if we assume that Columbus was using two different lengths for a league; so the Watlings theory, which measures in two different leagues, also founders. There are only two theories left: Plana and Samana.

H4 The actual distance from Fortune, the Plana-Samana island IV, is 11 to 13 leagues in each case (Plana or Samana), depending on the exact length taken for a league. For the Plana-Samana track we must assume that Columbus did not actually see the distance from San Salvador to Isabela, but instead calculated it, perhaps in a manner similar to the way I have done in Figure 7; and further, that his computation was somewhat in error. This explanation is not entirely satisfactory, and I have given it a 1 on the Scorecard. Nevertheless, this distance is much closer for Plana and Samana (an error of 3 to 5 leagues) than for any other theory save Caicos. At Watlings and Conception, the distance is a huge 25 to 30 leagues. Mitchell accounts for this distance by supposing that the entire southern half of Long Island somehow slipped from Columbus's mind as he wrote this entry³⁵ — an idea so strained that the theory could sink on that basis alone.

H5 In addition to this internal inconsistency, the Columbus-couldn't-have-returned argument has been demolished by a recent discovery. Alex Perez³⁶ has noticed a remarkable description in Las Casas' *Historia de las Indias*:³⁷ the relevant passage takes place just prior to Columbus leaving Fernandina — in search of Saometo, the native name for island IV.

³⁵ Mitchell 1992.

³⁶ Alejandro R. Perez, "Did Las Casas Have Columbus's Map?", August 20, 1992. Letter to Molander's *Columbus Landfall Round Robin* (fn 3).

³⁷ The *Historia* was the major work of Las Casas, in preparation for which he copied and paraphrased the *Diario*. Since the relevant sections of the *Historia* are clearly drawn from the *Diario*, landfall-dispute historians have mostly ignored the *Historia*, rightly preferring the more original source. However, the *Diario* was not the only source that Las Casas drew upon in preparation of the *Historia*.

Because the Indians, which he had taken in the first island of Guanahani or San Salvador, told him and indicated through signs that the island of Saometo [IV], which had been left behind, was larger³⁸ than Fernandina [III], and that they should return to it (and they must have done this in order to get closer to their land, from where he had taken them), the Admiral decided to turn around toward the east

H6 Two things are clear from this: first, that Saometo had been left behind during the trip from island I to island III; and, second, that returning to Saometo would bring the natives of Guanahani closer to their home. Perez has speculated that Las Casas had access to Columbus's map at the time he wrote this, which would account for these geographical concepts which are not immediately obvious in the *Diario*. In any case, this startling new evidence provides another heavy burden for all theories save Plana and Samana.

I Conclusions

I1 Regardless of which theory one supports, the important point is this: any theory, to be viable, must at least approximately fit the internally consistent cycle of distances among the four islands. Any theory that cannot is in trouble. Of all landfall theories that have been advanced, only two, Plana & Samana, are even remotely consistent with this internal cycle.

I2 And of these two, Plana must be preferred for three reasons. First: Columbus saw a light on the night of October 11 at 10 o'clock. From Plana, the island of Mayaguana lies about 40 miles east; the light he saw was on Mayaguana, somewhat to the west of south. [Note: since "landfall" refers to sighting, then, technically, this paper is actually suggesting that Mayaguana might have been Columbus's first landfall. Or: lightfall?] From Samana there is no such island to the east, and thus nowhere³⁹ for that light to be.

I3 Second, Plana has a coast that runs north-northeast, as Columbus describes the coast of San Salvador. Samana has no such coastline.

I4 Finally, and most importantly, Plana agrees with Columbus's description of island II (§F6) that "the face which is toward San Salvador runs North-South": the single most important description (§C11) in the *Diario* fits Plana perfectly, but it does not fit Samana, nor any other possible landfall site.

I5 In contrast, there is hardly one description in the *Diario* that can be decisively said to fit Samana better than Plana. The objection that Plana is two islands is based not on any firm evidence in the *Diario*, but rather on a presumption (contra §E9), in the supposed absence of such evidence. The biggest strength of the Samana theory is the track after San Salvador, which Plana shares; and the biggest weakness of the Samana theory is the description of San Salvador itself, which Plana wins easily. Clearly, Plana is by far the best fit to the descriptions in the *Diario*, and sets a new standard — by which all other theories must henceforth be judged.

³⁸ [If so, and if the Plana track is true, then "Saometo" refers not only to Fortune but to Crooked and perhaps even Acklins, in combination. (If Columbus, too, sometimes mentally combined nearly-contiguous Fortune & Crooked, this helps ease the III-to-IV directional problem of §F12: Figure 6 vs. Figure 8. Note also §§F11&F13: net sailing direction not due eastward.)]

³⁹ Why did Columbus not see Mayaguana but later did notice Plana? Assuming the Plana track, we note: [a] Plana's distance at discovery was less than that of Mayaguana when the light was reported. [b] The Moon rose (i.e., apparent terminator on sealevel horizon) at 10:30 PM, Local Apparent Time — thus, the well-risen moon's light upon Plana was stronger and more direct than the oblique rising-moon's light falling upon Mayaguana earlier. [No irresistible alternate ocular theories explain the 10 PM light; but, to try our best, we check out the sky: The 2nd magnitude star Ras Alhague set (azimuth $A = 284^\circ = 14$ degrees north of due west) at 9:51 PM LAT (sealevel); at 9:30 PM, apparent $h = 4^\circ 27'$, $A = 282^\circ$, zero-aerosol post-extinction magnitude $\mu = 3.6$; at 9:40 PM, $h = 2^\circ .3$, $A = 283^\circ$, $\mu = 4.3$; at 9:45 PM, $h = 1^\circ 1/4$, $A = 284^\circ$, $\mu = 5.0$. (The h cited here are sealevel: unenhanced by $7'$ dip, for height 15 m.) Morison (fn 2) 1:297 is understandably skeptical: for the claimed light-sighting, Columbus "demanded and obtained the annuity of 10,000 maravedis promised by the Sovereigns to the man who first sighted land."]